Since this more recent theory, in this way, gives us a conclusive physical reason of one of the most important phenomena coming into consideration in storms, I have allowed myself to designate it as the 'physical' theory."

Let us now consider the hypothesis that the maximum and minimum barometric pressures depend upon descending and ascending currents. Dr. Hann does not seem to confide wholly in the anticyclone hypothesis of areas of high pressure, though he still calls them anticyclones. He therefore devised another hypothesis to account for them—namely, that they result from an increase of pressure by the downward current which he supposes exists in these areas, and so regards them as the cause, at least mostly, and not as the effect of the high pressures. He still adheres to the old hypothesis that the zones of high pressure a little beyond the tropics in both hemispheres are caused by the crowding of the upper poleward currents into intermeridional spaces gradually becoming narrower toward the poles, and so by their being deflected down towards the earth's surface, although these high-pressure zones have long since been satisfactorily accounted for, without any mere hypothesis, upon true mechanical principles. Starting out from this hypothesis, he says that even beyond these zones there must be local obstructions and a damming up of the air in places in the higher latitudes, and a consequent deflecting of the currents down toward the earth's surface (*Zeitsch. für Meteorologie*, B. xiv., p. 39). This seems to be what is meant by the forms of motion, in the quotation above, to which is ascribed mostly the temperature relations in the barometric maximums and minimums. It does not appear, however, how the minimums of pressure can be explained by this hypothesis, for both ascending and descending currents require an increase of pressure at the bottom, where there are no lateral differences of temperature and density.

The preceding hypothesis, unlike many others, can readily be tested by means of the well-known formula showing the relation between pressure and velocity, which is based upon true and undisputed principles of mechanics. If there were a perpendicular wall around the globe on the 35th parallel of latitude, extending up to the top of the atmosphere, so that any poleward motion would have to be entirely stopped, and we suppose the upper half of the atmosphere between it and the equator to have a poleward motion toward this wall of 10 miles per hour, and that the whole is stopped, turned downward, and deflected back on the lower half of the atmosphere, the greatest increase of barometric pressure, according to the formula, which could arise from this, would be less than 0·004 of an inch. But a very small part only of the air in these high-pressure zones is stopped and turned downward, and the rest passes on to higher latitudes, so that the real effect must be very much less than this. But the observed excess of pressure in these zones is about 0·3 of an inch on the average. Hence the hypothesis could not account for the one-seventy-fifth part of it if all the kinetic energy were there converted into pressure; but considering the very small part which is so changed, it scarcely accounts for the one-thousandth part.

With regard to high-pressure areas being caused by descending currents, it would require a downward velocity of more than 170 miles per hour to cause an increase of 1 inch in the barometric pressure. The same effect would be produced by a horizontal current of that velocity if the kinetic energy were all converted into pressure by a total stoppage of the current; but where the velocity is only slightly hindered by a damming up through obstructions, the velocity would have to be many times more. Hence the hypothesis is entirely inadequate to cause even any measurable increase of barometric pressure.

Wm. Ferrel.

Martinsburg, W. Va., U.S.A.

THE FLORA OF THE REVILLAGIGEDO ISLANDS.

The somewhat peculiar flora of Lower California, as revealed by comparatively recent American explorations, aroused the curiosity of botanists concerning the probable composition of the vegetation of the Revillagigedo group of islands, situated between 18° and 19° N. lat., off the west coast of Mexico. During the spring of 1889, the United States Fish Commission steamer *Albatross* visited the two principal islands, Socorro and Clarion; and Dr. G. Vasey and Mr. J. N. Rose have just published the results of their investigations of a collection of dried plants made in these islands by Mr. C. H. Townsend, the ornithologist of the expedition. A less interesting flora could hardly be imagined, if this be a fair sample of it; but on this point the report in question affords no information whatever. Considering the distance of the islands from the nearest points of the continent, and the size of the principal island, a flora possessing some peculiarities might have been expected, and possibly the few dried plants brought away by Mr. Townsend by no means represent the flora, either as to quantity or as to quality.

Socorro is described as the largest of the group, about twenty-four miles long by nine broad, with elevations up to 2000 feet; and the position is given as 18° 43′ 14″ latitude and 110° 54′ 13″ longitude, being about 260 miles south of Cape San Lucas, Lower California, and nearly the same distance from the nearest point of the Mexican coast. Clarion, a much smaller island, in nearly the same latitude, lies about 4° to the west.

"The total number of species found on the two islands was twenty-six; eighteen are from Socorro, and twelve from Clarion Island, four of which they have in common." The sentence quoted is preceded by the statement that the flora of these islands is doubtless tropical and similar to that of Mexico; a statement that is a little ambiguous, because, although these islands are situated within the north tropic, the plants collected are mostly characteristic of warm temperate and sub-tropical regions rather than of the tropics. In this apparently poor flora, for there is no mention of the existence of any other plants besides those enumerated, are such widely-dispersed plants as *Portulaca pilosa*, *Waltheria americana*, *Tribulus cistoides*, *Dodonæa viscosa*, *Sophora tomentosa*, *Elytraria tridentata*, and *Lantana involucrata*. Ten of the others are undetermined species of common genera, and may be common species; three are described as new, one of which had been previously collected in Lower California—*Cardiospermum Palmeri*, *Perityle socorroensis*, and *Teucrium townsendii*. The Mexican *Aristolochia brevipes*, and the widely spread tropical American parasite *Phoradendron rubrum*, are also recorded as doubtful identifications, the material being too scanty to admit of certainty. This is all the information one can extract from the report; perhaps a more detailed account of the islands and their natural history may appear in some other publication connected with the expedition.

W. Botting Hemsley.

ON LOCAL MAGNETIC DISTURBANCE OF THE COMPASS IN NORTH-WEST AUSTRALIA.

As the subject of how far the compasses of a ship, when near land, are affected by local magnetic disturbance has hitherto been more frequently one of controversy rather than a study of facts, it seems important that full publicity should be given to well-authenticated observations.

In September 1885, on board H.M. surveying-vessel *Meda*, when passing Bezout Island near Cossack, North-West Australia, a steady deflection of her compass of 30° was observed, whilst the ship was running over half a mile

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in a north-north-west direction and in a depth of eight fathoms of water. This remarkable result has since been exceeded by observations made in H.M. surveying-vessel *Penguin* on November 6, 1890.

On this occasion, the *Penguin*, being 2 miles N. 79° E. from Bezout Island, a deflection of 22° was observed in her compass. The ship was immediately anchored, and some hours of the next day were spent in drifting backwards and forwards near that position, and the following results were obtained.

On Bezout Island the absolute values of the variation and dip were normal, the dip being 50° 1'·7 S. But at a position N. 79½° E., distant 2·14 miles from that on Bezout Island, the observed dip on board was 83° S., with a very small deflection of the compass. This may be considered the central point of the disturbing force. At 900 feet to the westward of this the dip was normal, and it decreased rapidly as the centre was quitted in any direction. At about 100 feet south of the centre of disturbance, the compass was deflected 55°. This was the largest deflection observed, but the compass was disturbed over an area of about a square mile. The general depth of water in this area was nine fathoms, and the quality of the bottom quartz sand.

The observations of the magnetic elements at Cossack and the neighbourhood showed little or no disturbance from local magnetic effects. It is therefore evident from the remarkable results now related, which have been derived from observations of undoubted accuracy, that the deflections of the compass in the *Meda* and *Penguin* were due to magnetic minerals at the bottom of the sea adjacent to the ship.

All well-authenticated observations point to a similar source, when deflections of the compass are caused by local magnetic forces external to a ship navigating near a coast.

E. W. CREAK.

NOTES.

A GENERAL meeting of the International Congress of Hygiene and Demography was held on Monday. The Prince of Wales, who presided, announced that the Queen had consented to act as patron of the Congress. In the report of the Organizing Committee, which was read by Sir Douglas Galton, it was stated that the opening meeting would take place at St. James's Hall on August 10, under the presidency of the Prince of Wales, and the sectional meetings would be held on the five following days in the rooms of the learned Societies at Burlington House. A special committee had been formed to call attention to the Congress in India, and special representations and invitations had been forwarded to foreign Governments (through the Foreign Office), the colonies (through the Agents General), and also to county, municipal, and local councils throughout the country. The Corporation of London had voted £2000 for an entertainment to the Congress, to be given in the Guildhall, and there could be no doubt that much hospitality would be offered to the Congress during its session. The organization of the Congress involved a very large expenditure, first for making the Congress known throughout the world and making the necessary arrangements for its sections, and secondly for the publication of the transactions. It was estimated that between £5000 and £6000 would be necessary, and for this sum an appeal would be made. Sir Spencer Wells read a report from the Reception Committee, Dr. Corfield a report from the Foreign Committee, and Mr. Digby a report from the Indian Committee. It appeared that the Governments of France, Italy, and Switzerland, and several of the colonies, had already accepted invitations to send delegates to the Congress. The reply of the Indian Government had not yet been received, but Lord Cross was fully alive to the importance of India being represented at the gathering. In replying to a vote of thanks for presiding, the Prince of Wales said he had little doubt the seventh Congress would be even more useful than any of its predecessors.

MR. EDWARD BARTLETT, lately Curator of the Maidstone Museum (son of Mr. A. D. Bartlett, Superintendent of the Zoological Society's Gardens), has been appointed by Rajah Brooke to be Curator of the new Museum at Sarawak. Mr. Bartlett will shortly leave England for Sarawak to take up his new duties. The series to be placed in the Museum at Sarawak will be entirely confined to Borneo objects, which Mr. Bartlett will make every exertion to render as complete as possible. He will have the assistance of some excellent native collectors, by whose aid he hopes to make many discoveries in the still imperfectly known fauna of Borneo.

WE regret to have to record the death of Captain Daniel Pender, R.N., Assistant Hydrographer to the Admiralty. He died on the 12th inst., at the age of 58. Captain Pender had a remarkably extensive knowledge of the Pacific, where he served on various ships for a good many years.

DR. J. ERIC ERICHSEN was one of the speakers at the meeting held at the Mansion House on February 23, for raising a fund in aid of the extension of University and King's Colleges. His speech has now been printed separately, and ought to do excellent service to the movement on behalf of which it was delivered. Dr. Erichsen has much to say as to the good work accomplished by both institutions, and pleads eloquently for the support needed to enable them to comply adequately with the intellectual conditions of the present age.

THE Council of the Society of Arts will consider, early in May next, the award of the Albert Medal, and invite members of the Society to forward to the Secretary, on or before April 18, the names of such men of high distinction as they may think worthy of the honour. The medal was struck to reward "distinguished merit for promoting arts, manufactures, or commerce."

THE Shaen Memorial Wing of the Bedford College for Ladies (York Place, Baker Street), with the new science lecture-rooms and laboratories, to which we have already referred, will be formally opened by the Empress Frederick on Tuesday, March 24, at 4 p.m.

THE second International Ornithological Congress is to be held in Budapest at Whitsuntide. The opening ceremony and exhibition is on Sunday, May 17, and the concluding session on May 20, after which various excursions, beginning on the 21st, will be made. It is intended to divide the Congress into seven Sections, viz.: (1) Systematy; (2) Biology; (3) Anatomy; (4) Avigeography; (5) Oology; (6) Migration; (7) Economical Ornithology. The President of the General Committee is Count Bethlen, the Minister of Agriculture, and the President of the Scientific Committee, Dr. Otto Herman. The official head-quarters will be the National Museum, Budapest.

AN Electrical Exhibition was opened by the Lord Mayor on Monday in the St. Pancras Vestry Hall. The electric light is to be supplied to the parish by the Vestry, and the object of the present exhibition is to familiarize the inhabitants with the various conditions of electric illumination.

AMONG the deaths registered in the Zoological Society's Gardens last week, was that of a European Crane (*Grus cinerea*), which was acquired by purchase on May 13, 1848, and had thus lived nearly forty-three years in the Gardens. This is not quite so good a case as that of the Black Parrot (*Coracopsis vasa*), which died in 1884, after having lived fifty-four years in the Regent's Park.

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